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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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Attorney Docket No.: ISPH-0520

Inventors: Crooke et al.

Serial No.: 09/781,712

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Filing Date: February 12, 2001

Examiner: Not Yet Assigned

Group Art Unit: 1635

Title: Methods of Using Mammalian RNase H and Compositions Thereof

I, Jane Massey Licata, Registration No. 32,257, certify that this correspondence is being depositing with the U.S. Postal Service as First Class mail in an envelope addressed to the Assistant Commissioner for Patents and Trademarks, Washington, D.C. 20231.

On this date: July 5, 2001

Jane Massey Licata
Jane Massey Licata, Registration No. 32,257

Assistant Commissioner for Patents
Washington, DC 20231

Sir:

INFORMATION DISCLOSURE STATEMENT

Pursuant to 37 C.F.R. §1.56 and in accordance with 37 C.F.R. §§1.97-1.98, information relating to the above-identified application is hereby disclosed. Inclusion of information in this statement is not to be construed as an admission that this information is material as that term is defined in 37 C.F.R. §1.56(b).

- (XX) In accordance with §1.97(b), since this Information Disclosure Statement is being filed either within three months of the filing date of the above-identified application, within three months of the date of entry into

the national stage of the above identified application as set forth in §1.491, or before the mailing date of a first Office Action on the merits of the above-identified application, no additional fee is required.

- () In accordance with §1.97(c), this Information Disclosure Statement is being filed after the period set forth in §1.97(b) above but before the mailing date of either a Final Action under §1.113 or a Notice of Allowance under §1.311, therefore:
 - () Certification in Accordance with §1.97(e) is set forth below; or
 - () The fee of \$240.00 as set forth in §1.17(p) is attached.
- () In accordance with §1.97(d), this Information Disclosure Statement is being filed after the mailing date of either a Final Action under §1.113 or a Notice of Allowance under §1.311 but before the payment of the Issue Fee, therefore included are: Certification in Accordance with §1.97(e); Petition Requesting Consideration of the Information Disclosure Statement; and the fee of \$130.00 as set forth in §1.17(i)(1).
- (xx) Copies of each of the references listed on the attached Form PTO-1449 (modified) are enclosed herewith.
- () In accordance with §1.98(d), copies of some or all of the references listed on the attached Form PTO-1449 (modified) are not enclosed herewith because they were previously

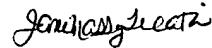
submitted to the U.S. Patent and Trademark Office in prior application Serial No. _____, filed _____, for which a claim for priority under 35 U.S.C. §120 has been made in the instant application.

Please charge any deficiency or credit any overpayment to Deposit Account No. 50-1619. This form is submitted in duplicate.

() The relevance of the listed references in a foreign language is as stated in the specification at pages @@.

(XX) All listed references are in the English language.

Respectfully submitted,



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Date: July 5, 2001

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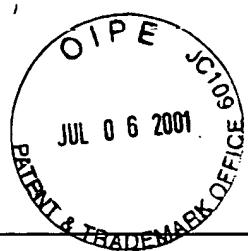
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	AA	Agrawal, et al., "Site-specific excision from RNA by Rnase H and mixed-phosphate-backbone oligodeoxynucleotides", <i>Proc. Natl. Acad. Sci. USA</i> 1990 87:1401-1405
	AB	Boado et al., "Complete Inactivation of Target mRNA by Biotinylated Antisense Oligonucleotide-Avidin Conjugates", <i>Bioconjugate Chem.</i> 1994 5:406-410
	AC	Bordier et al., "Sequence-specific inhibition of human immunodeficiency virus (HIV) reverse transcription by antisense oligonucleotides:Comparative study in cell-free assays and in HIV-infected cells", <i>Proc. Natl. Acad. Sci. USA</i> 1995 92:9383-9387
	AD	Büsen et al., "Distinct Ribonuclease H Activities in calf Thymus", <i>Eur. J. Biochem.</i> 1975 52:179-190
	AE	Büsen et al., "Ribonuclease H Levels during the Response of Bovine Lymphocytes to Concanavalin A", <i>Eur. J. Biochem.</i> 1977 74:203-208
	AF	Büsen W., "Purification, Subunit Structure, and Serological Analysis of Calf Thymus Ribonuclease H I*", <i>J. of Biol. Chem.</i> 1980 255(19):9434-9443
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	AH	Cazenave et al., "Comparative inhibition of rabbit globin mRNA translation by modified antisense oligodeoxynucleotides", <i>Nuc. Acids Res.</i> 1989 17:4255-4271
	AI	Cerritelli et al., "Cloning, Expression, and Mapping of Ribonucleases H of Human and Mouse Related to Bacterial Rnase HI", <i>Genomics</i> 1998 53:300-307

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AK	Crooke et al., "Kinetic characteristics of Escherichia coli RNASE H1: cleavage of various antisense oligonucleotide-RNA duplexes", <i>Biochem.</i> 1995 312:599-608
AL	Crouch et al., "Ribonucleases H", Nuclease Linn and Roberts, Eds. Cold Spring Harbor Laboratory Press, Plainview, NY 1982 211-241
AM	Dagle et al., "Targeted degradation of mRNA in Xenopus oocytes and embryos directed by modified oligonucleotides: studies of An2 and cyclin in embryogenesis", <i>Nucl. Acids Res.</i> 1990 18(16):4751-4757
AN	Dash et al., "Selective elimination of mRNAs in vivo: Complementary oligodeoxynucleotides promote RNA degradation by an RNase H-like activity", <i>Proc. Natl. Acad. Sci. USA</i> 1987 84:7896-7900
AO	Dean et al., "Inhibition of Protein Kinase C- α Expression in Human A549 Cells by Antisense Oligonucleotides Inhibits Induction of Intercellular Adhesion Molecule 1 (ICAM-1) mRNA by Phorbol Esters", <i>J. Biol. Chem.</i> 1994 269(23):16416-16424
AP	Eder et al., "Substrate specificity of human RNase H1 and its role in excision repair of ribose residues misincorporated in DNA", <i>Biochimie</i> 1993 75:123-126
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AR	Frank et al., "Cloning, Subcellular Localization and Functional Expression of Human RNase HII", <i>Biol. Chem.</i> 1998 379:1407-1412

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	AT	Furdon et al., "RNase H cleavage of RNA hybridized to oligonucleotides containing methylphosphonate, phosphorothioate and phosphodiester bonds", <i>Nucl. Acids Res.</i> 1989 17(22):9193-9204
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	AV	Ghosh et al., "Phosphorothioate-phosphodiester oligonucleotide co-polymers:assessment for antisense application", <i>Anti-Cancer Drug Design</i> 1993 8:15-32
	AW	Giles et al., "Enhanced RNase H activity with methylphosphonodiester/phosphodiester chimeric antisense oligodeoxynucleotides", <i>Anti-Cancer Drug Design</i> 1992 7:37-48
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	AY	Godard et al., "Antisense effects of cholesterol-oligodeoxynucleotide conjugates associated with poly(alkylcyanoacrylate) nanoparticles", <i>Eur. J. Biochem.</i> 1995 232:404-410
	AZ	Gottikh et al., " $\alpha\beta$ Chimeric Antisense Oligonucleotides: Synthesis and Nuclease Resistance in Biological Media", <i>Antisense Res. Dev.</i> 1994 4:251-258
	BA	Hausen et al., "Ribonuclease H An Enzyme Degrading the RNA Moiety of DNA-RNA Hybrids", <i>Dur. J. Biochem.</i> 1970 14:278-283

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	BB	Hoke et al., "Effects of phosphorothioate capping on antisense oligonucleotide stability, hybridization and antiviral efficacy versus herpes simplex virus infection", <i>Nucl. Acids Res.</i> 1991 19(2):5743-5748
	BC	Itaya et al., "Selective cloning of genes encoding RNASE H from <i>Salmonella typhimurium</i> , <i>Saccharomyces cerevisiae</i> and <i>Escherichia coli rnh</i> mutant", <i>Mol. Gen. Genet.</i> 1991 277:438-445
	BD	Itaya et al., "Molecular cloning of a ribonuclease H (RNase HI) gene from an extreme thermophile <i>Thermus thermophilus</i> HB8:a thermostable RNase H can functionally replace the <i>Escherichia coli</i> enzyme <i>in vivo</i> ", <i>Nucl. Acids Res.</i> 1991 19(16):4443-4449
	BE	Itaya M., "Isolation and characterization of a second RNase H (RNase HII) of <i>Escherichia coli</i> K-12 encoded by the <i>rnhB</i> gene", <i>Proc. Natl. Acad. Sci. USA</i> 1990 87:8587-8591
	BF	Kanaya, et al., "Importance of the Positive Charge Cluster in <i>Escherichia coli</i> Ribonuclease HI for the Effective Binding of the Substrate", <i>J. Biol. Chem.</i> 1991 266(18) 11621-11627
	BG	Kanaya et al., "Expression, Purification, and Characterization of a Recombinant Ribonuclease H from <i>Thermus thermophilus</i> HB8", <i>J. Biol. Chem.</i> 1992 267(14):10184-10192
	BH	Kane C., "Renaturase and Ribonuclease H: A Novel Mechanism That Influences Transcript Displacement by RNA Polymerase II in Vitro", <i>Biochemistry</i> 1988 27:3187-3196
	BI	Katayanagi et al., "Three-dimensional structure of ribonuclease H from <i>E. coli</i> ", <i>Nature</i> 1990 347:306-309
	BJ	Katayanagi et al., "Crystal Structure of <i>Escherichia coli</i> RNase HI in Complex with Mg ²⁺ at 2.8 Å Resolution:Proof for a Single Mg ²⁺ Binding Site", <i>Proteins: Struct., Funct., Genet.</i> 1993 17:337-346

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BK	Kawasaki E., "Quantitative hybridization-arrest of mRNA in Xenopus oocytes using single-stranded complementary DNA or oligonucleotide probes", <i>Nucl. Acids Res.</i> 1985 13:4991-5005
BL	Lee et al., "Antisense Gene Suppression Against Human ICAM-1, ELAM-1, and VCAM-1 in cultured Human Umbilical Vein Endothelial Cells", <i>Shock</i> 1995 4(1):1-10
BM	Lima et al., "Binding Affinity and Specificity of <i>Escherichia coli</i> RNASE H1: Impact on the Kinetics of Catalysis of Antisense Oligonucleotide-RNA Hybrids", <i>Biochemistry</i> 1997 36:390-398
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BO	Liu et al., "Suppression of Ischemia-induced Fos Expression and AP-1 Activity by an Antisense Oligonucleotide to c-fos mRNA", <i>Ann. Neurol.</i> 1994 36:566-576
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BQ	Nakamura et al., "How does RNase H recognize a DNA-RNA hybrid?", <i>Proc. Natl. Acad. Sci. USA</i> 1991 88:11535-11539
BR	Quartin et al., "Number and distribution of methylphosphonate linkages in oligodexynucleotides affect exo-and endonuclease sensitivity and ability to form RNase H substrates", <i>Nucl. Acids Res.</i> 1989 17:7253-7262
BS	Rong et al., "On the Molecular Weight and Subunit Composition of Calf Thymus Ribonuclease H1", <i>Biochemistry</i> 1990 29:383-389

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	BU	Saison-Behmoaras et al., "Short modified antisense oligonucleotides directed against Ha-ras point mutation induce selective cleavage of the mRNA and inhibit T24", <i>EMBO J.</i> 1991 10:1111-1118
	BV	Stein et al., "Enzyme from Calf Thymus Degrading the RNA Moiety of DNA-RNA Hybrids:Effect on DNA-Dependent RNA Polymerase", <i>Science</i> 1969 166:393-395
	BW	Tidd et al., "Evaluation of N-ras oncogene anti-sense, sense and nonsense sequence methylphosphonate oligonucleotide analogues", <i>Anti-Cancer Drug Des.</i> 1988 3:117-127
	BX	Tidd et al., "Partial protection of oncogene, anti-sense oligodeoxynucleotides against serum nuclease degradation using terminal methylphosphonate groups", <i>Br. J. Cancer</i> 1989 60:343-350
	BY	Walder et al., "Role of RNASE H in hybrid-arrested translation by antisense oligonucleotides", <i>Proc. Natl. Acad. Sci. USA</i> 1988 85:5011-5015
	BZ	Wintersberger U., "Ribonucleases H of Retroviral and Cellular Origin", <i>Pharmac. Ther.</i> 1990 48:259-280
	CA	Wu et al., "Molecular Cloning and Expression of cDNA for Human RNase H", <i>Antisense Nucl. Acid Drug Dev.</i> 1998 8:53-61
	CB	Yang et al., "Structure of Ribonuclease H Phased at 2 Å Resolution by MAD Analysis of the Selenomethionyl Protein", <i>Science</i> 249:1398-1405

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